

# Faisal Shah Khan

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## SUMMARY

Mathematician with 15+ years of experience in quantum computing, game theory, and interdisciplinary education. Proven ability to translate technical research into actionable insights for academic, corporate, and policy audiences. Skilled in cross-sector collaboration, technical consulting, and science communication.

## KEY HIGHLIGHTS & QUALIFICATIONS

### Educational Leadership

- Designed and taught undergraduate and graduate courses in mathematics, statistics, engineering, and business with quantum components.
- Supervised multiple student research projects on quantum computing and its applications in finance, imaging, and secure communication.

### Outreach & Public Engagement

- Author of *QuantumSheikh.org*, a blog demystifying quantum computing and quantum game theory for diverse audiences.
- Speaker and panelist at public events including UNC Quantum Fall Fest, National Academy of Sciences' Arab-American Symposium, and NC Tech Day.

### Grant Writing Experience

- Principal Investigator on grants from Khalifa University and the Swedish Foundation for International Research Cooperation.
- Led projects including a quantum random number generator (Kammiya) and quantum communication for drones and autonomous systems.

### Collaboration & Program Development

- Organized experiential learning visits for students, including a quantum lab visit to Duke University.
- Built partnerships across academia, industry, and government to support quantum education and workforce development.

### Editorial & Leadership Roles

- Associate Editor for *Quantum Information Processing* journal (2019–2021).
- Organizer for IEEE Quantum Week events and international workshops on quantum technology.

## EXPERIENCE

**Research Fellow** 📅 04/2024 - Present 📍 Chapel Hill, NC  
Rethinc. Labs, UNC Kenan-Flagler Business School

- Conducting and supporting research on quantum game theory applications in financial markets, in collaboration with UNC-affiliated researchers.
- Supporting dissemination of findings through academic publications, public engagement, and policy channels.

## EDUCATION

**PhD. in Mathematical Sciences (Quantum Game Theory)**

Portland State University

📅 2009

**M.S. in Mathematics**

Portland State University

📅 2003

**B.S. in Mathematics**

Santa Clara University

📅 1997

## GRANT WRITING & RESEARCH DEVELOPMENT

**Principal Investigator - Khalifa University (2017-2019)**

*Toward a Quantum Safe Security Infrastructure in the UAE* - Secured competitive internal grant to develop a turnkey quantum random number generator-enabled LAN using off-the-shelf components.

**Principal Investigator - Khalifa University (2018 - 2021)**

Secured grant to develop quantum communication protocols for autonomous systems and drones; led execution and coordinated educational workshops.

**Principal Investigator - Swedish Foundation for International Research Cooperation (2014)**

Secured international grant to develop quantum game-theoretic models for constrained optimization problems.

## CURRENT & EMERGING RESEARCH INTERESTS

**Quantum Trading Infrastructure & Alpha Discovery**

Developing a quantum-native trading platform in collaboration with UNC researchers and ion-trap quantum specialists, leveraging quantum game-theoretic market models on quantum hardware to identify alpha-generating equilibria.

**Quantum Discord in Extensive-Form Quantum Games**

Exploring quantum behavioral strategies for extensive-form games with imperfect recall, aiming to demonstrate how quantum discord—without entanglement—can serve as a minimal, physically realizable resource for exceeding classical bounds on rationality.

## EXPERIENCE

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### Adjunct Professor

📅 2021 - Present 📍 Raleigh, NC

SKEMA Business School USA

- *Aug 2021 – Present | Raleigh, NC*  
Teach courses including Business Statistics, Business Intelligence, and AI Consulting.
- Founded and advise the Data Science & Quantum AI student club.
- Designed and led quantum literacy activities for business students.

### Senior Project Consultant

📅 08/2021 - 10/2022 📍 Dubai, UAE

DP World

- Designed and implemented quantum algorithms to optimize container yard operations, enhancing logistical efficiency.
- Facilitated adoption of quantum solutions through outreach to internal stakeholders and technical knowledge transfer across teams.

### Assistant Professor

📅 01/2010 - 06/2020 📍 Abu Dhabi, UAE

Khalifa University

- Taught mathematics and engineering courses to math and engineering students.
- Supervised student research at undergraduate and graduate levels, with emphasis on quantum computing and its applications.
- Arranged academic outreach events and curricula for STEM engagement.
- Committee member for development of undergraduate math degree with tracks in statistics and finance.
- Principal Investigator (2018-2020): Led development of a quantum random number generator platform and promoted quantum adoption through industry and government collaborations.

## EDUCATIONAL OUTREACH & PUBLIC ENGAGEMENT

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### Talks & Presentations

- *Guest Speaker*, Quantum Fall Fest, UNC Chapel Hill –11/2024.
- *Panelist*, Why We Need to Know the Future of Quantum Computing, NC Tech & Lenovo – 05/2024.
- *Presentation on AI & Quantum*, O'Brien Atkins Associates – 01/2024.
- Keynote speaker, Quantum Future Hack, Dubai Economic Dept & Ernst & Young, Dubai, 05/2019.

### Student Mentorship & Advising

- *External Mentor*, Senior Design Project on Quantum Hardware, NC State, 08/2024 – 05/2025.
- *Faculty Advisor*, Graduate Thesis on AI in French Education, SKEMA Business School, 06/2023 – Present.
- *Supervisor*, Undergraduate Thesis on Quantum Finance, Khalifa University, 01/ 2018 –12/2018.

### Program Development & Events

- *Organizer & Facilitator*, Graduate student visit to Duke University's Quantum Science Center, 04/2024.
- *Organizer*, IEEE Quantum Week Workshops – 2020–2021.

## SELECTED PUBLICATIONS

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### Quantum Advantage in Trading: A Game-Theoretic Approach

Quantum Economics and Finance

*with Norbert M. Linke, Anton Than, Dror Baron*

📅 04/2025

🔗 <https://doi.org/10.1177/29767032251333418>

Demonstrates quantum advantage in trading using game-theoretic models on an ion-trap quantum computer, with outcomes that suggest potential for alpha generation.

### Calculating Nash Equilibrium on Quantum Annealers

Annals of Operations Research

*with Olga Okrut et al.*

📅 01/2024

🔗 <https://doi.org/10.1007/s10479-023-05700-z>

Demonstrates a QUBO formulation of Nash equilibrium solvable on quantum annealers, with observed speedup.

### Quantum Information Technology and Innovation: A Brief History, Current State and Future Perspectives for Business and Management

Technology Analysis & Strategic Management

*with Davide La Torre*

📅 09/2021

🔗 <https://doi.org/10.1080/09537325.2021.1991576>

Explores the evolution and strategic relevance of quantum information technologies for business innovation and management.

### Optimal Control of Traffic Signals Using Quantum Annealing

Quantum Information Processing

*with Hashem Hussain et al.*

📅 08/2020

🔗 <https://doi.org/10.1007/s11128-020-02815-1>

Applies QUBO-based optimization to time-dependent traffic signal control on a grid network, demonstrating a hybrid quantum-classical solution using quantum annealing hardware.

*Full list of publications available upon request.*

## SELECTED TALKS

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### When Recall Fails, Discord Remembers: A Quantum Analogue of Kuhn's Theorem

📅 05/2025

NC State Quantum Initiative annual symposium.

### Quantum Advantage in Trading: A Game-Theoretic Approach

📅 04/2025

Penn Initiative for the Study of Markets, University of Pennsylvania.

## EDUCATIONAL OUTREACH & PUBLIC ENGAGEMENT

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### Media & Public Recognition

- *Featured Expert*, Phys.org article on North Carolina's quantum leadership, 10/2022.
- *Featured Expert*, Wired Middle East, contributed insights on Abu Dhabi's quantum ecosystem, 08/2022.
- *Profiled*, Very Digital Person, Digitale Welt Magazine (Germany), 05/2021.

## LEADERSHIP & AFFILIATIONS

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### Member

NC Coalition for Global Competitiveness – 2023–Present.

### Founder & Principal Investigator

Dark Star Quantum Lab, 2021–2023.

### Technology Advisor

Quantum Computing Inc, 2019–2022.

## SKILLS

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Research Development

Public Speaking

Curriculum Design

Grant Writing

Stakeholder Engagement

Interdisciplinary Collaboration

Education Outreach

Science Communication

Technical Writing

Basic MATLAB

Basic Python

Modeling

Data Analysis

## SELECTED TALKS

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Is There a World Market for Five Quantum Computers, or Will They Be as Common as Flying Cars?

📅 10/2023

9th Arab-American Frontiers Symposium, United States National Academy of Sciences, Doha, Qatar.

Quantum Computing: The Apotheosis of Artificial Intelligence

📅 04/2021

Arab AI Summit.

Innovative Pairings: ALTAIR 8800 + Microsoft & Apple I + MOS Technology 6502 Chip - Some Lessons for the Quantum Technology Ecosystem

📅 12/2020

Remote talk sponsored by Washington D.C. Quantum Computing Meetup Group + Cambridge Quantum Computing + Association Quantum.

*Full list of presentations and talks available upon request.*

## REFERENCES

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Available Upon Request